

IN THE CLAIMS

Please amend Claims 13, 14, 16, 18-24, 37, 38, 40, 42-48, 50 and 52, to read as follows.

1-12. (Canceled)

13. (Currently Amended) An apparatus for determining the location of a boundary between a speech containing portion and a background noise containing portion in an input speech signal, the apparatus comprising:

means for receiving the input signal;

means for processing the received signal to generate an energy signal indicative of the local energy within the received signal;

speech detection means operable to process ~~said~~ the received signal and to identify when speech is present in the received signal;

means for determining the likelihood that ~~said~~ the boundary is located at each of a plurality of possible locations within ~~said~~ the energy signal; and

means for determining the location of ~~said~~ the boundary using ~~said~~ the likelihoods determined for each of ~~said~~ the possible locations,

wherein said likelihood determining means is ~~operable~~ restricted to determine ~~said~~ the likelihoods in the received signal only when said speech detecting means detects speech within the received signal.

14. (Currently Amended) An apparatus according to claim 13, wherein said likelihood determining means is operable to determine the likelihood that ~~said~~ the boundary is located at each of ~~said~~ the possible locations by: (i) comparing a portion of the energy signal on one side of the current location with a model representative of the energy in background noise; (ii) comparing ~~the~~ a portion of the energy signal on the other side of the current location with a model representative of the energy within speech; and (iii) combining the results of ~~said~~ the comparisons to determine a likelihood for the current possible location.

15. (Canceled)

16. (Currently Amended) An apparatus according to claim 13, further comprising means for filtering ~~said~~ the energy signal to remove energy variations which have a frequency below a predetermined frequency.

17. (Original) An apparatus according to claim 16, wherein said filter means is operable to filter out energy variations below 1Hz.

18. (Currently Amended) An apparatus according to claim 13, wherein said processing means is operable to divide the input speech signal into a number of successive time frames and to determine the energy of the input signal in each of ~~said~~ the time frames to generate a discrete energy signal.

19. (Currently Amended) An apparatus according to claim 16, wherein said filter means is operable to output a number of discrete samples representing ~~said~~ the filtered energy signal.

20. (Currently Amended) An apparatus according to claim 19, wherein said likelihood determining means is operable to determine ~~said~~ the likelihood for each of ~~said~~ the discrete filtered energy values.

21. (Currently Amended) An apparatus according to claim 13, wherein ~~said~~ the boundary is at the beginning or at the end of a speech containing portion of ~~said~~ the received signal.

22. (Currently Amended) An apparatus according to claim 14, wherein ~~said~~ the models are statistical models.

23. (Currently Amended) An apparatus according to claim 22, wherein ~~said~~ the models are based on Laplacian statistics.

24. (Currently Amended) An apparatus according to claim 22, wherein ~~said~~ speech model ~~is an~~ the models are auto-regressive ~~model~~ models.

25-36. (Canceled)

37. (Currently Amended) A method of determining the location of a boundary between a speech containing portion and a background noise containing portion in an input speech signal, the method comprising the following steps [[of]]:

receiving the input signal;

processing the received signal to generate an energy signal indicative of the local energy within the received signal;

a speech detection step which processes ~~said~~ the received signal and identifies when speech is present in the received signal;

determining the likelihood that ~~said~~ the boundary is located at each of a plurality of possible locations within ~~said~~ the energy signal; and

determining the location of ~~said~~ the boundary using ~~said~~ the likelihoods determined for each of ~~said~~ the possible locations,

wherein ~~said~~ likelihood determining step ~~determines~~ ~~said~~ is restricted to determine the likelihoods in the received signal only when said speech detecting step detects speech within the received signal.

38. (Currently Amended) A method according to claim 37, wherein said likelihood determining step determines the likelihood that ~~said~~ the boundary is located at each of ~~said~~ the possible locations by: (i) comparing a portion of the energy signal on one side of the current location with a model representative of the energy in background noise; (ii) comparing ~~the~~ a portion of the energy signal on the other side of the current location with a model representative

of the energy within speech; and (iii) combining the results of ~~said~~ the comparisons to determine a likelihood for the current possible location.

39. (Canceled)

40. (Currently Amended) A method according to claim 37, further comprising ~~the~~ a step of filtering ~~said~~ the energy signal to remove energy variations which have a frequency below a predetermined frequency.

41. (Original) A method according to claim 40, wherein said filtering step filters out energy variations below 1Hz.

42. (Currently Amended) A method according to claim 37, wherein said processing step divides the input speech signal into a number of successive time frames and determines the energy of the input signal in each of ~~said~~ the time frames to generate a discrete energy signal.

43. (Currently Amended) A method according to claim 40, wherein said filtering step outputs a number of discrete samples representing ~~said~~ the filtered energy signal.

44. (Currently Amended) A method according to claim 43, wherein said likelihood determining step determines ~~said~~ the likelihood for each of ~~said~~ the discrete filtered energy values.

45. (Currently Amended) A method according to claim 37, wherein ~~said~~ the boundary is at the beginning or at the end of a speech containing portion of the received signal.

46. (Currently Amended) A method according to claim 38, wherein ~~said~~ the models are statistical models.

47. (Currently Amended) A method according to claim 46, wherein ~~said~~ the models are based on Laplacian statistics.

48. (Currently Amended) A method according to claim 46, wherein ~~said speech model is an~~ the models are auto-regressive ~~model~~ models.

49. (Canceled)

50. (Currently Amended) A computer readable medium storing computer executable process steps for controlling a processor to implement a method of detecting speech ~~with~~ within an input signal, the process steps comprising the steps of:

receiving the input signal;

processing the received signal to generate an energy signal indicative of the local energy within the received signal;

processing ~~said~~ the received signal to identify when speech is present in the received signal;

determining the likelihood that ~~said~~ the boundary is located at each of a plurality of possible locations within ~~said~~ the energy signal; and

determining the location of ~~said~~ the boundary using ~~said~~ the likelihoods determined for each of ~~said~~ the possible locations,

wherein said likelihood determining ~~determines said~~ step is restricted to determine the likelihoods in the received signal only when speech is detected within the received signal.

51. (Canceled)

52. (Currently Amended) Computer executable process steps for controlling a processor to implement a method of detecting the presence of speech ~~with~~ within an input signal, the process steps comprising the steps of:

receiving the input signal;

processing the received signal to generate an energy signal indicative of the local energy within the received signal;

processing ~~said~~ the received signal to identify when speech is present in the received signal;

determining the likelihood that ~~said~~ the boundary is located at each of a plurality of possible locations within ~~said~~ the energy signal; and

determining the location of ~~said~~ the boundary using ~~said~~ the likelihoods determined for each of ~~said~~ the possible locations,

wherein said likelihood determining ~~determines said~~ step is restricted to determine the
likelihoods in the received signal only when speech is detected within the received signal.